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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,320	06/15/2005	Christian Hentschel	NL 021371	2729

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EXAMINER

LEE, JOHN W

ART UNIT	PAPER NUMBER
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2624

MAIL DATE	DELIVERY MODE
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09/14/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/539,320	HENTSCHEL, CHRISTIAN	
	Examiner	Art Unit	
	John Wahnkyo Lee	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-13 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>20050615</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. An initialed and dated copy of Applicant's IDS form 1449, Paper No. 20050531, is attached to the instant Office action.

Claim Objections

2. Claim 12 is objected to because of the following informality: claim 12 is disclosed as a dependent claim of claim 14. However, there is no claim 14, and the lower number claims cannot be a dependent claim of the higher number claim. The examiner will consider claim 12 as a dependent claim of claim 10 for further examination. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 2 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. "The convolution ... with a third kernel" in claim 2 is not clearly disclosed in the specification. The specification does mention about this claim limitation,

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but it does not show how it is used or implemented. The example for this claim limitation does not cover the scope or clearly explains it.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 3-6, 9, and 13 recite the limitation "non-separable." There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claim 13 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 13 is drawn to functional descriptive material NOT claimed as residing on a computer readable medium. MPEP 2106.IV.B.1(a) (Functional Descriptive Material) states:

"Data structures not claimed as embodied in a computer-readable medium are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer."

"Such claimed data structures do not define any structural or functional interrelationships between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized."

Claim 13, while defining a computer program product, does not define a "computer-readable medium" and is thus non-statutory for that reasons. A computer program product can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody the program on "computer-readable medium" in order to make the claim statutory.

"In contrast, a claimed computer-readable medium encoded with the data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory." - MPEP 2106.IV.B.1(a)

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-6, 8-9, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. ("A Novel Interpolation Scheme For Quincunx-Subsampled Images") in view of Shah et al. ("Theory and Design of Multidimensional QMF Sub-band Filters 1-D Filters and Polynomials Using Transforms").

Regarding claim 1, Lee teaches a method of converting a first image with a first resolution into a second image with a second resolution, the first resolution being different from the second resolution (abstract, "image interpolation tires to ... higher-

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resolution image from an original image with a lower resolution ...”), the method comprising: pixel value insertion (Fig. 3; abstract, Section 3., “interpolation”). However Lee does not teach the last claim limitation of claim 1, but Shah does. Shah discloses convolution based on a non-separable multi-dimensional kernel which comprises a plurality of coefficients being equal to zero, a first portion of the plurality of coefficients being disposed on a first diagonal line through the non-separable multi-dimensional kernel (equations (5)-(15); section 2., “diamond-shaped lowpass kernel”) and a second portion of the plurality of coefficients being disposed on a second diagonal line through the non-separable multi-dimensional kernel, the second diagonal line being perpendicular to the first diagonal line (equations (5)-(15); section 2., “diamond-shaped lowpass kernel”).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Shah’s method in Lee’s method to provide a computationally efficient approach and promising reconstruction quality as suggested by Lee (page 150).

Regarding claim 2, Lee further teaches that the pixel value insertion comprises replication of pixel values of the first image (Section 1, “image interpolation ... pixel replication in ... pixel”).

Regarding claim 3, Lee further teaches the pixel value insertion comprises insertion of pixels with values equal to zero (abstract; section 2., “zero-mask technique”); Shah further teaches the convolution is performed with a second kernel

which is based on a further convolution of the non-separable multi-dimensional kernel with a third kernel (equations (5)-(15); section 2., "diamond-shaped lowpass kernel").

Regarding claim 4, Shah further teaches a diamond shaped lowpass kernel, which is the same with the matrix disclosed in claim 3 (equations (5) and (6); section 2.)

Regarding claims 5 and 6, the matrix disclosed in claim 5 and 6 is just an expansion of the diamond shaped lowpass kernel (Shah, equations (5) and (6); section 2.), which can be a design choice. The applicant does not disclose that the matrix in claims 5 and 6 provides an advantage, is used for a particular purpose or solves a stated problem. Because the matrix disclosed in claims 5 and 6 is just a design choice and a dimensional expansion of the diamond shaped lowpass kernel taught by Shah, it would have been obvious to one skilled in the art to modify and expand the diamond shaped lowpass kernel to obtain the invention as specified in claims 5 and 6.

Regarding claim 8, Lee further teaches sub-sampling (abstract; section 2, "quincunx subsampling lattice").

Regarding claims 9 and 13, claims 9 and 13 is analogous and correspond to claim 1. See rejection of claim 1 for further explanation.

10. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. ("A Novel Interpolation Scheme For Quincunx-Subsampled Images") in view of Shah et al. ("Theory and Design of Multidimensional QMF Sub-band Filters 1-D Filters and Polynomials Using Transforms"), and further in view of Arai et al. (US 2002/0104092).

Regarding claim 10, Lee and Shah teach all the previous claim limitations except the ones recited in claim 10. However, Arai discloses an image processing apparatus (Figs. 1-3; abstract), comprising: receiving means for receiving a signal (Fig. 1-101; paragraphs [0028] and [0054], "image supply source") corresponding to a first image (Fig. 1-211; paragraph [0029] and [0031], "image input part"); and an image conversion unit (Fig. 3-1003 and 1004; paragraphs [[0050]-[0052], "High-Resolution Image Generator", "Low-Resolution Image Generator", "pixel interpolation", and "line interpolation") converting the first image with a first resolution into a second image with a second resolution (paragraphs [0050]-[0052]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Shah's method and Arai's invention in Lee's method to provide a computationally efficient approach and promising reconstruction quality as suggested by Lee (page 150).

Regarding claim 11, Arai discloses further comprising a display device for displaying the second image (Figs. 1-601 and 701; paragraph [0030], "fixed TV set" and "portable terminal").

Regarding claim 12, Arai further discloses a TV (Fig. 1-601; paragraph [0030], "fixed TV set").

Allowable Subject Matter

11. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Wahnkyo Lee whose telephone number is (571) 272-9554. The examiner can normally be reached on Monday - Friday (Alt.) 7:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

John W. Lee
(AU 2624)


JINGGE WU
SUPERVISORY PATENT EXAMINER